

### **Amendments to the Claims:**

The following listing of claims will replace all prior versions and listings of claims in the application:

#### **Listing of Claims:**

1. (Currently Amended) An iterative decoding and equalizing device for high bit rate communication over frequency-selective channels with multiple transmit and receive antennas, said device comprising:

a decision feedback equalizer adapted to receive data from different receive antennas and including a forward filter and a recursive backward filter fed with calculated weighted reconstituted data from an ~~[[the]]~~ output of a channel decoder with weighted inputs and outputs fed by decision means~~[[,]]~~; and

subtraction means for subtracting an ~~[[the]]~~ output of said recursive backward filter from ~~[[the]]~~ output data of the forward filter to output subtracted data,

wherein the subtracted data is fed to an ~~[[the]]~~ input of the decision means along with the output of the channel decoder,

wherein the decision means produce a statistic which is forwarded to the ~~[[a]]~~ channel decoder ~~with weighted inputs and outputs~~,

wherein said decision means take into account ~~[[the]]~~ space noise correlation at an ~~[[the]]~~ output of the subtraction means,

wherein the decision means and the channel decoder are separated by space-time interleaving at a binary level, and

wherein the forward filter and ~~the~~ said recursive backward filter are iteratively adapted to minimize ~~the~~ a mean square error at the output of the subtraction means ~~subtractor~~.

2. (Currently Amended) The device according to claim 1, wherein the decision means at the output of the subtraction means of the decision feedback equalizer are of ~~the~~ a space whitening type and include ~~followed by~~ a sphere decoder.

3. (Currently Amended) The device according to claim 1, wherein the decision means at the output of the subtraction means of the decision feedback equalizer are of the serial and/or parallel type Serial Interference Cancellation/ Parallel Interference Cancellation (SIC/PIC) adapted to cancel residual space interference at the output of the subtraction ~~Subtraction~~ means of the decision feedback equalizer.

4. (Currently Amended) The device according to claim 1, wherein ~~[[the]]~~ space whitening is effected at the output of the subtraction means of the decision feedback equalizer.

5. (Previously Presented) The device according to claim 4, wherein the space whitening is effected by the decision means.

6. (Currently Amended) The device according to claim 2, wherein the space whitening is effected by the forward filter and the recursive backward filter.

7. (Previously Presented) The device according to claim 1, wherein, starting from a certain

iteration, the forward filter is an adapted filter.

8. (Currently Amended) A ~~[[The]]~~ system for high bit rate communication over frequency-selective channels with multiple transmit and receive antennas, comprising:

a receiver that includes the iterative decoding and equalizing ~~an equalization and decoding~~ device according to claim 1.

9. (Currently Amended) The system according to claim 8, comprising:

transmitter means adapted to transmit data from different transmit antennas,

wherein the transmitter means are of the Space-Time Bit-Interleaved Coded Modulation (ST-BICM) type.

10. (Canceled)

11. (Canceled)

12. (Canceled)

13. (Canceled)

14. (Canceled)

15. (Canceled)

16. (Currently Amended) An iterative equalization and decoding method for high bit rate communications over frequency-selective channels with multiple transmit and receive antennas, comprising:

a step of decision feedback equalizing of data received from the receive antennas; and

a step of decoding with the aid of a channel decoder with weighted inputs and outputs,

wherein said decision feedback equalizing step comprises:

a step of filtering said received data by a forward filter;

a step of filtering a weighted reconstruction of the data calculated on the basis of data at an [[the]] output of said channel decoder by a backward filter;

a step of subtracting an [[the]] output of said backward filter from [[the]] data at [[the]] an output of said forward filter to output subtracted data; and

a step of detecting applied to the subtracted data obtained following the subtracting step and to the data at the output of said channel decoder, said detecting step taking into account spatial correlation of an error of said decision feedback equalizing step obtained as output from said subtracting step and generating a statistic probabilistic information transmitted to the channel decoder after a step of spatio-temporal interleaving at a binary level,

wherein the forward and backward filters are configured in an iterative manner to minimize a mean square error obtained following the subtracting step.

17. (New) The method according to claim 16, wherein the step of filtering the weighted reconstruction of the data calculated on the basis of the data at the output of said channel decoder

by the backward filter of the decision feedback equalizing step is also adapted iteratively to minimize the mean square error inputted to the decision feedback equalizing step.

18. (New) The method according to claim 16, further comprising:

a step of whitening said error obtained as the output from said subtracting step.

19. (New) The method according to claim 16, wherein said detecting step implements a sphere decoding algorithm.

20. (New) The method according to claim 16, wherein, in said step of filtering said received data by the forward filter, starting from a certain iteration, the forward filter is an adapted filter.